Claims

We claim:

	1.	A composition for modulating the immune response in a subject comprising a
mute	in of inte	rleukin-1 (IL-1) having reduced toxicity to a human compared to the
corre	sponding	; wild-type IL-1.

- 2. The composition according to claim 1, wherein said IL-1 is IL-1 β .
- 3. The composition according to claim 1, wherein said IL-1 is mature IL-1 β .
- 4. The composition according to claim 1, wherein said IL-1 is human IL-1.
- 5. The composition according to claim 1, wherein a positively charged residue of said IL-1 has been replaced with any of the other 17 natural amino acids.
- 6. The composition according to claim 5, wherein said positively charged residue is arginine or lysine.
- 7. The composition according to claim 6, wherein said IL-1 is mature human IL-1 β and wherein said positively charged residue replaced is arginine at position 127.

- 8. A method of modulating the immune response of a subject to a vaccine antigen comprising administering an effective amount of interleukin-1 (IL-1) mutein having reduced toxicity, in concurrent or sequential combination with said vaccine antigen.
 - 9. The method according to claim 8, wherein said IL-1 is IL-1 β .
 - 9. The method according to claim 8, wherein said IL-1 is IL-1 β .
 - 10. The method according to claim 8, wherein said IL-1 is mature IL-1 β .
 - 11. The method according to claim 8, wherein said IL-1 is human IL-1 β .
- 12. The method according to claim 8, wherein a positively charged residue of said IL-1 has been replaced with any of the other 17 natural amino acids.
- 13. The method according to claim 12, wherein said positively charged residue is arginine or lysine.
- 14. The method according to claim 13, wherein said IL-1 is mature human IL-1 β and wherein said positively charged residue replaced is arginine at position 127.
- 15. The method according to claim 8, wherein said vaccine antigen is selected from the group consisting of proteins, peptides, hormones and glycoproteins.

- 16. The method according to claim 8, wherein said vaccine antigen is selected from the group consisting of viral antigen, fungal antigen, parasitic antigen, bacterial antigen, allergen, auto-immune related antigen and tumor-associated antigen.
- 17. The method according to claim 8, wherein said IL-1 mutein is administered by a method selected from the group consisting of mucosally, intramuscularly and subcutaneously.
- 18. The method according to claim 8, wherein said IL-1 mutein is administered in a pharmaceutically acceptable vehicle.
 - 19. The method according to claim 8, wherein said subject is a vertebrate.
 - 20. The method according to claim 8, wherein said subject is human.